Chapter 2.15

URBAN PUBLIC STREET DESIGN STANDARDS

The Department of Public Works and Utilities is assigned responsibility for administration of these design standards.

Section 1. GENERAL

This standard shall apply to all public streets located within the City or located within an area to be annexed upon subdivision approval.

The design of public streets in the City of Lincoln generally conforms to the *Minimum Design Standards* of the State of Nebraska Board of Public Roads Classifications & Standards, *A Policy on Geometric Design of Highways and Streets* of the American Association of State Highway and Transportation Officials (AASHTO) and the *Drainage Criteria Manual* of the City of Lincoln, Nebraska. Details of street construction shall conform to the *City of Lincoln Standard Specifications for Municipal Construction* and the *Lincoln Standard Plans*.

Section 2. POLICIES

2.1 General

The City of Lincoln street system is designed to promote the safe and efficient movement of vehicular and pedestrian traffic from point of origin to point of destination and to provide an infrastructure element which can be readily maintained.

2.2 Intersections with Major Streets

Where control of access permits, the intersections of collector streets with major streets shall be spaced approximately one half mile (0.8 km) apart, with the intersection location dependant upon maintaining the required sight distances. Intersections of local streets with major streets, where permitted, shall be approximately one quarter mile (0.4 km) apart, with the intersection location dependant upon maintaining the required sight distances.

2.3 Provisions for Future Extensions

In new developments, streets which are intended to be extended beyond the limits of the development shall be paved to those limits and shall be designed to provide for the proper handling of surface drainage, storm runoff and the future projection of the street and utilities into the adjacent property. The developer shall be responsible for obtaining and paying the costs for any easements required to permit grading or construction of approved temporary drainage measures beyond the limits of the development.

2.4 Reviewing Agencies

All plans for construction of public street improvements shall be reviewed and approved by the Public Works and Utilities Department.

Section 3. DESIGN AND CONSTRUCTION

3.1 Design Speed

The following design speeds shall be applied for the design of public streets:

Street Classification	Design Speed
Local Streets	25 mph (40 km/h)
Collector Streets	30 mph (50 km/h)
Major Streets	Determined by Public Works and Utilities Department

3.2 Sight Distances

Unobstructed sight distances as set forth in *Figures SD-1, SD-2, SD-3* and *SD-4* of *APPENDIX A,* shall be provided at all street intersections and alley accesses for vehicular and pedestrian traffic safety. Fences, walls, signs or other obstructions shall not be placed in the public street and shall not be placed in the sight triangles as set forth in *Figures SD-1, SD-2, SD-3 and SD-4* except that chain-link fences free from shrubbery and vines may be placed on private property within the sight triangles at uncontrolled or yield controlled intersections.

3.3 Horizontal Street Alignment

3.3.1. Intersections

a. Angle of Intersection

Streets shall intersect as near as possible at right angles. In no case shall the angle of intersection vary more than 10 degrees from a right angle.

b. Intersection Separation

Where the streets do not continue through the intersection (T-Type) a minimum separation of at least 120 feet (36.58 m), as measured between the centerlines, shall be maintained.

c. Intersections on Curvilinear Streets

Where a curvilinear street intersects another, a straight tangent section shall be required at the approach to the intersection. The length required for this tangent is dependent upon the radius of the approaching curve. The minimum length of this tangent, as measured from the right-of-way of the intersected street to the point of curvature, shall be as shown in the following table:

Centerline Radius	**Minimum Tangent Length**
150 ft. (45.7 m)	100 ft. (30.5 m)
175 ft. (53.3 m)	90 ft. (27.4 m)
200 ft. (61.0 m)	80 ft. (24.4 m)
225 ft. (68.6 m)	75 ft. (22.9 m)
250 ft. (76.2 m)	70 ft. (21.3 m)
275 ft. (83.8 m)	65 ft. (19.8 m)
300 ft. (91.4 m)	60 ft. (18.3 m)
350 ft. (106.7 m)	50 ft. (15.2 m)
400 ft. (121.9 m)	20 ft. (6.1 m)
450 ft. (137.2 m) and over	No Tangent Required

d. T-Type intersections on Horizontal Curves

T-Type intersections may be permitted along the outside of any horizontal curve provided the minimum sight distances are provided, based on the design speed of the intersected curved street, and that the minimum approach tangent length is provided in the case of a curvilinear approaching street.

T-Type intersections may be permitted along the inside of a horizontal curve provided that the centerline radius of the curve is 525 feet (160 m) or greater, and that the minimum sight distances, based on the design speed of the intersected curved street, and the minimum approach tangent length, in the case of a curvilinear approaching street, are provided.

3.3.2. Curvilinear Alignment

a. Horizontal Curves

All changes of horizontal alignment between intersections shall be connected by circular curves. The minimum centerline radius for curves on local streets shall be 150 feet (45.7 m). The minimum centerline radius for collector streets shall be 385 feet (117.3 m). The minimum centerline radii for curves on major streets shall be determined by the Public Works and Utilities Department.

b. Tangents Between Horizontal Curves

A straight tangent having a minimum length of at least 100 feet (30.5 m) shall be provided between adjacent non-compound horizontal curves where the sum of the radii of the curves is less than 600 feet (182.9 m).

3.3.3. Cul-de-Sacs

Geometry and details of standard symmetrical and offset type cul-de-sacs for the various property line radii are shown on *Figures S-1, S-2 and S-3*.

a. Center Island

A curbed center island having a diameter of 30 feet (9.1 m) may be placed at the center of the cul-de-sac. The center island shall be landscaped using approved plant materials not exceeding a maximum mature height of 24 inches and certain designated street trees conforming to the requirements of the *Design Standards for Street Trees.* Trees placed in the center island shall be trimmed up to 6 feet (1.8 m) above the ground and maintained for traffic sight clearance. Landscape maintenance including replacement and the maintenance of the center island curb, by written agreement between the City and the appropriate parties, shall be the responsibility of the abutting property owners, a homeowners association, or other private entity. Landscaping plans shall include a program for maintenance and replacement of trees and plant material and shall be approved by the Department of Public Works and Utilities and the City Parks and Recreation Department. All landscaping shall be installed within two planting seasons following the paving construction.

3.4 Vertical Street Alignment

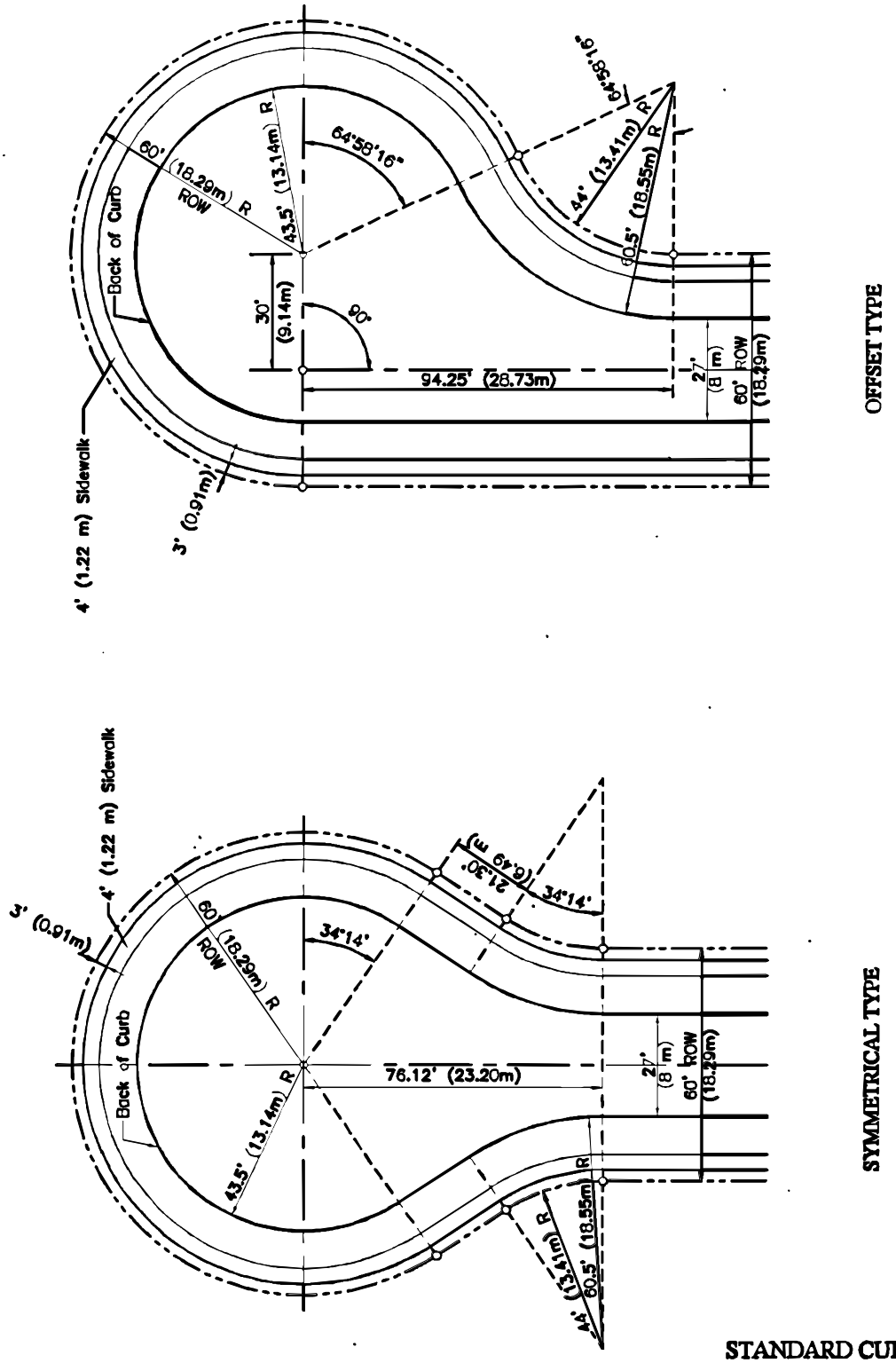
3.4.1. Longitudinal Grades

a. Minimum

The minimum longitudinal grade for all public streets shall be 0.5% to provide for adequate surface drainage.

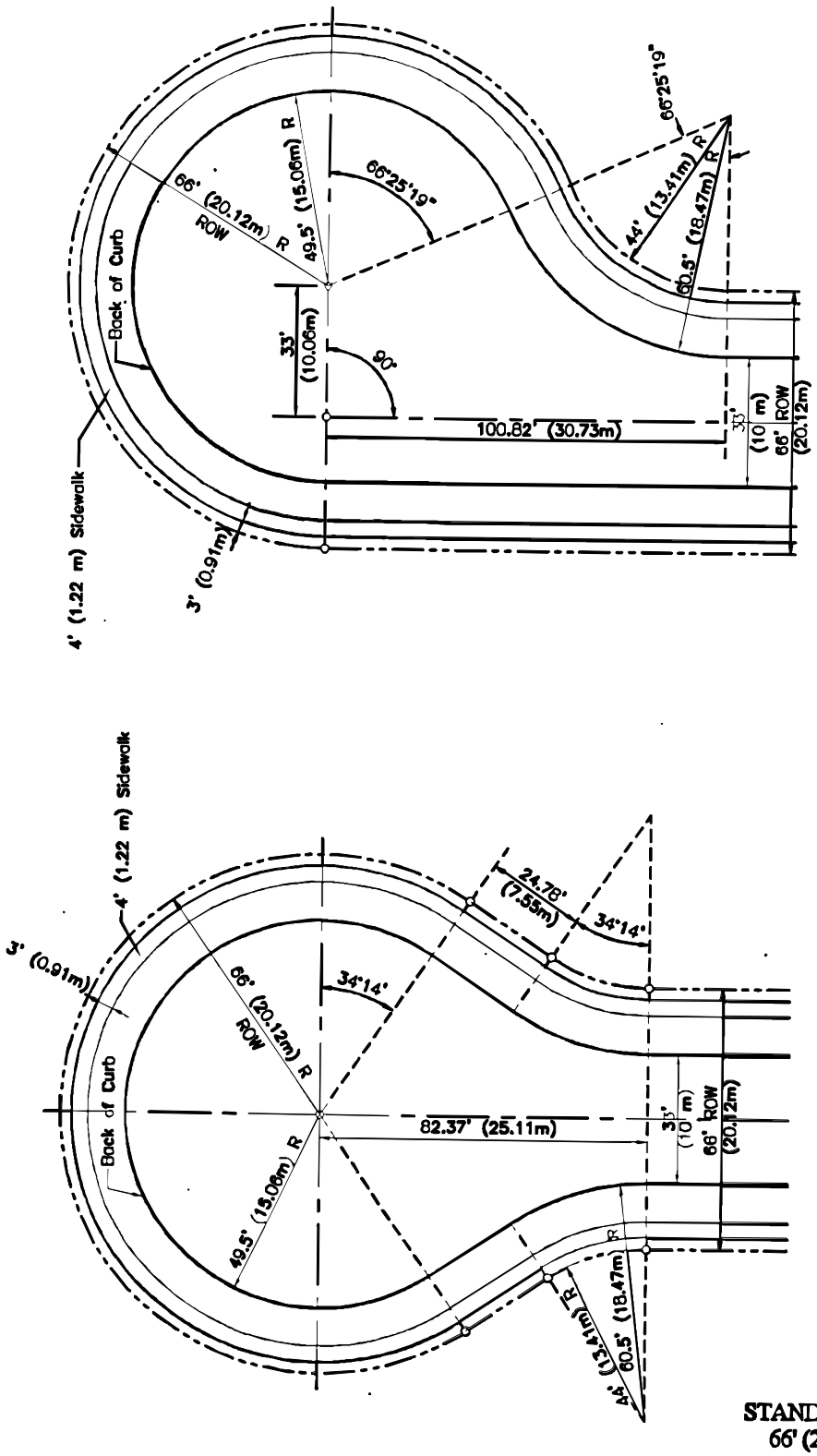
b. Maximum

The maximum longitudinal grade shall be 8.0% for local streets and 7.0% for collector streets. Maximum grades for major streets shall be determined by the Department of Public Works and Utilities Department.



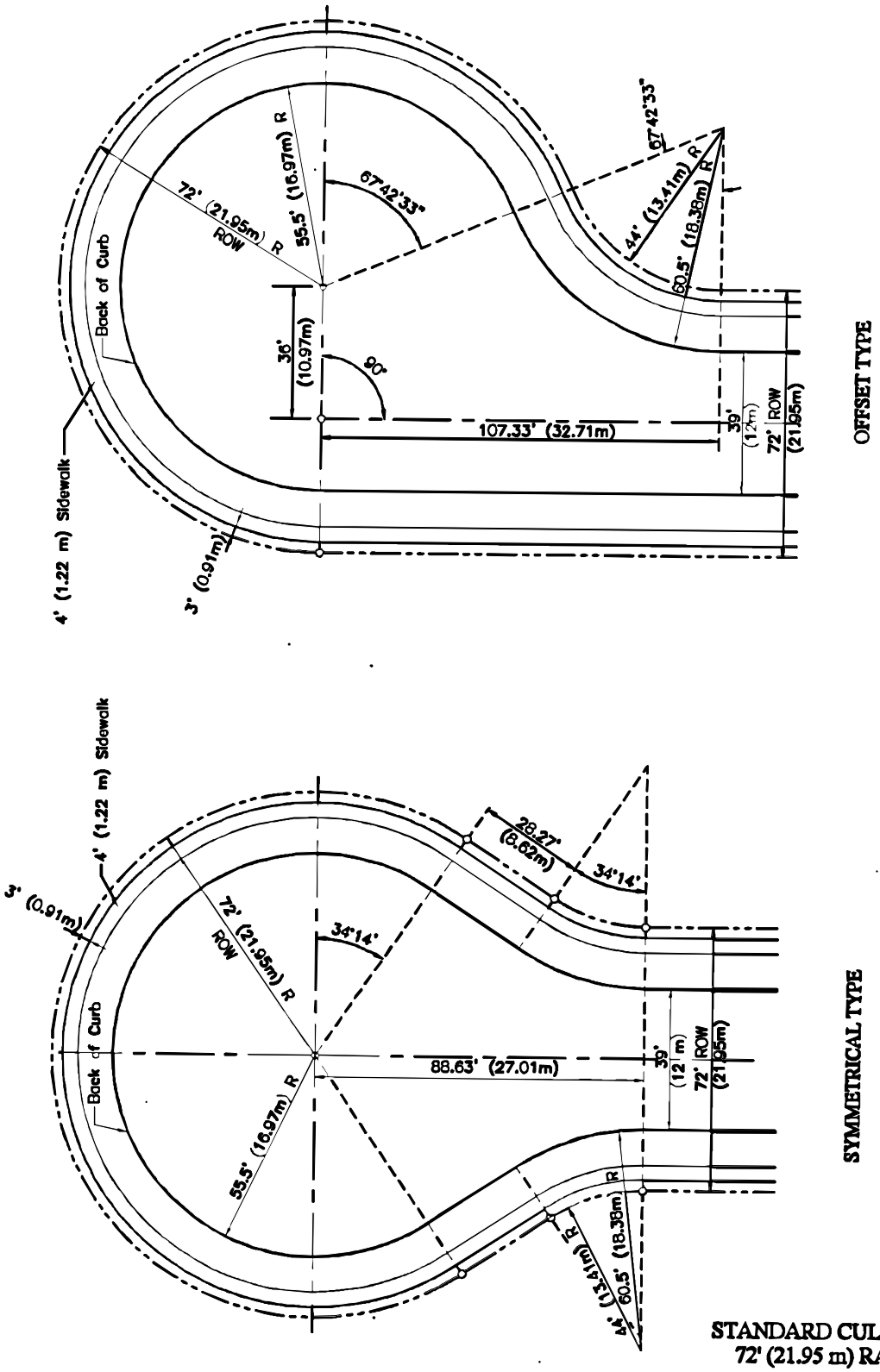
STANDARD CUL-DE-SAC
60' (18.29 m) RADIUS

FIGURE S-1



STANDARD CUL-DE-SAC
66' (20.12 m) RADIUS

FIGURE S-2



STANDARD CUL-DE-SAC
72' (21.95 m) RADIUS

FIGURE S-3

3.4.2. Vertical Curves

Changes in longitudinal grades shall be designed using parabolic vertical curves. Where the algebraic difference between the two grades expressed in percent is 1.0 or less, no curve is required. The minimum length of vertical curves necessary to provide adequate safe stopping sight distance shall be determined using the following formula:

$$\mathbf{L = K\ A}$$

Where: L = Minimum length of curve as measured in a horizontal plane.
K = A measure of curvature, values of which are set forth in the following table.
A = The algebraic difference between the grades of the tangents to the curve expressed in percent.

Design Speed mph (km/h)	**K- Value** Crest Curves feet (meter)	**K-Value** Sag Curves feet (meter)
25 (40)	20 (5)	30 (8)
30 (50)	30 (9)	35 (11)
35 (55)	40 (11)	45 (13)
40 (65)	60 (18)	55 (17)
45 (70)	80 (22)	68 (20)
50 (80)	110 (32)	80 (25)
55 (90)	150 (43)	103 (30)

For vertical curves connecting flatter grades, care shall be taken to provide adequate slope for drainage. Generally, K < 165 (50 metric) for both sag and crest curves. The length of the vertical curve shall be kept as close as practicable to the minimum length as determined by the above procedure.

3.4.3. Intersection Approaches

a. Major Streets

The grade of any street approaching a major street shall not exceed 3.0% within 130 feet (39.6 m) of the closest curb line of the intersected roadway.

b. Collector Streets

The grade of a local street approaching a collector street shall not exceed 3.0% within 70 feet (21.3 m) of the closest curb line of the intersected roadway.

c. Local Streets

The approach grades of all intersecting local streets which continue through the intersection shall not exceed 3.0% within 70 feet (21.3 m) of the closest curb line of the intersected roadway. At T-type intersections, the grades of the through street may exceed 3.0%.

d. Unimproved Major Streets

Where new developments abut major streets which are not yet improved to major street standards, approach grades, intersections and abutting property grading should be designed to accommodate the future grades of the major street. The grades and alignment of the major street shall be approved by the Public Works and Utilities Department.

3.5 Roadway Width

The following table sets forth standard roadway widths, as measured to the back of the curbs, for streets located within residential and commercial/industrial zoning districts:

Street Classification	Zoning	Roadway Width
Local	Residential	27 ft. (8 m)
Local	Commercial/Industrial	33 ft. (10 m) No Parking
Local	Commercial/Industrial	39 ft. (12 m) With Parking
Collector	Residential	39 ft. (12 m) No Median
Collector	Residential	2 - 21 ft. (6.4 m) Roadways with Median
Local - Permanent Turnaround (cul-de-sac)	Residential	43.1 ft. (13.14 m) Outside Radius
Local - Permanent Turnaround (cul-de-sac)	Commercial Industrial Office	No Parking - 49.5' (15.06 m) Outside Radius With Parking - 55.5 ft. (16.97 m) Outside Radius
Major Street	All	Determined by Public Works Department

In locations where the roadway width changes, those changes shall be accomplished using a tapered section. The minimum length of that taper shall be determined by multiplying the offset of the roadway edge by the design speed. Tapers shall not extend through intersections.

3.6 Street Grading Cross-Section

Generally, streets shall be graded to provide slope to the roadway from the building lines on either side of the street. This section will provide capacity in the street to carry excess runoff from major storms. Slopes from the top of curb to one foot (0.3m) back of the sidewalk line shall be 2.0%, except at those locations where it is necessary to allow for storm drainage overflow away from the roadway. In such case the area may be sloped away from the top of curb at a grade not exceeding 2.0%. The slope from the sidewalk to the building line should be not less than 2.0%. In areas where existing conditions might require that the sideslope to back of the sidewalk exceed 2% in order to achieve uniformity, the Public Works and Utilities Department may approve a steeper slope not to exceed 8%.

Excavation for streets, construction of embankments and roadway subgrade preparation and compaction shall conform to the requirements of the *City of Lincoln Standard Specifications for Municipal Construction.*

3.7 Roadway Cross-section

3.7.1. Pavement Crown

Except at intersections, roadway paving shall be designed with the top of the curbs level from one side to the other. On local and collector street roadways with no medians, the roadway surface shall have a transverse slope (crown) of 3.0% from the gutter line to the roadway centerline. Where medians are present, the roadway surface shall have a transverse slope of 3.0% across the entire roadway on each side of the median.

3.7.2. Curbs

Concrete curbs shall be placed on both sides of all roadways. Curbs on local and collector streets may be either combined curb and gutter or integral curb and shall conform to the requirements of the *City of Lincoln Standard Specifications for Municipal Construction* and the details shown on the *Lincoln Standard Plans*. Curb type and details for major streets shall be determined by the Public Works and Utilities Department.

3.7.3. Roadway Paving

Roadways shall be surfaced with either portland cement concrete pavement, a 2 ½" (65 mm) thick asphaltic concrete surface on a portland cement concrete base or a 2 ½" (65 mm) thick asphaltic concrete surface on an asphaltic concrete base. Minimum roadway pavement or base thickness for the various street classifications is shown in the following tables for the various pavement types. If the anticipated average daily truck traffic exceeds the limits set forth in the tables, the Public Works and Utilities Department may require greater surfacing thickness.

3.7.3.1. Portland Cement Concrete Pavement

Street Classification	Zoning	Thickness
Local	Residential ADTT*<50	6” (155 mm)
Local	Commercial/Industrial ADTT* < 300	8” (205 mm)
Collector	Residential ADTT*<50	6” (155 mm)
Collector	Commercial/Industrial ADTT *> 300 but < 800	9” (230 mm)
Major Street	All	Determined By Public Works Department

3.7.3.2. Asphaltic Concrete Pavement, Class 1 2 ½” (65 mm) Surface Course on Portland Cement Concrete Base

Street Classification	Zoning	Base Thickness
Local	Residential ADTT*<50	5” (125 mm)
Local	Commercial/Industrial ADTT* < 300	7 ½” (190 mm)
Collector	Residential ADTT*<50	6” (155 mm)
Collector	Commercial/Industrial ADTT* > 300 but < 800	8 ½” (215 mm)
Major Street	All	Determined By Public Works Department

3.7.3.3. Asphaltic Concrete Pavement, Class 2 2 ½” (65 mm) Surface Course on Asphaltic Concrete Base

Street Classification	Zoning	Base Thickness
Local	Residential	6” (155 mm)

* ADTT = Average Daily Truck Traffic
(excluding two axle trucks with four wheels)

3.8 Alley Pavement

Where permitted, the entire width of the alley shall be paved with portland cement concrete pavement of the same minimum thickness as set forth in Table 1 above and without curbs. Design and construction shall conform to the requirements of the *City of Lincoln Standard Specifications for Municipal Construction* and the details shown on the *Lincoln Standard Plans*.

3.9 Intersection Geometry

At intersections, the curbs of intersecting roadways shall be connected by circular curves having radii as shown in the following table (as measured to back of curb):

Street Classification	Zoning	Radius
Local	Residential	20 ft. (6 m)
Local	Commercial/Industrial	30 ft. (9 m)
Collector	Residential	20 ft. (6 m)
Collector	Commercial/Industrial	30 ft. (9 m)
Major Street	All	Determined by Public Works and Utilities Department

At intersections of local or collector streets with major streets, additional right or left turning lanes, medians, tapered roadway sections or other special features may be required to accommodate anticipated traffic. At the intersection of two major streets, additional lanes, larger radii, three centered curves or other special features may be required. The Public Works and Utilities Department will provide the specific design requirements at these locations on an individual basis.

3.10 Lateral Obstacle Clearance

Minimum obstacle clearance for curbed sections shall be 2 feet (0.6 m) as measured from the back of curb to the face of the obstacle. Minimum obstacle clearance for non-curbed sections shall be 8 feet (2.4 m) as measured from the edge of the driving lane to the face of the obstacle. Traffic control devices conforming to the standards of the *Manual on Uniform Traffic Control Devices* will be allowed in the obstacle clearance zone.

3.11 Temporary Turnarounds

Where required, temporary turnarounds shall be constructed in conformance with the details shown on the *Lincoln Standard Plans*. Direct access to the temporary turnaround from abutting properties will not be permitted.

3.12 Sidewalks

Sidewalks through open spaces and pedestrian walk easements, which are required by subdivision approval or special permits, shall be constructed as a part of the roadway paving project. Sidewalks in the public streets shall be constructed as required by subdivision approval.

3.12.1. Alignment

Where the sidewalk is located in the public street, the sidewalk shall generally be aligned parallel to the right-of-way line with the edge of the sidewalk located 3 ft. (0.91 m) from that line. The longitudinal sidewalk grade shall generally be parallel to the roadway curb grade. Sidewalks located in pedestrian easements shall be centered in that easement.

Sidewalks not located in the public street shall be constructed with smooth and aesthetically appropriate horizontal and vertical alignments which are free of abrupt changes and which generally blend with finish grading contours for the surrounding area. Normally, longitudinal grades for these sidewalks should not exceed 5%. Longitudinal grades not exceeding 8% may be used for short distances to overcome greater elevation differentials.

3.12.2. Cross-Section

Sidewalks shall be at least 4 ft. (1.22 m) wide and shall have a transverse slope of 2% in the direction of the natural surface drainage. Sidewalks shall be constructed of portland cement concrete and shall have a minimum thickness of 4 inches (100 mm).

Sidewalk construction shall conform to the requirements of the *City of Lincoln Standard Specifications for Municipal Construction*.

3.13 Drainage Facilities

Storm sewers, open channels, culverts, inlets and other drainage facilities and appurtenances shall conform to the requirements of the *Drainage Criteria Manual* of the City of Lincoln, Nebraska.

3.14 Roundabouts

3.14.1 General

Roundabout intersections as set forth herein are generally to be used in residential and commercial-industrial districts as traffic calming devices or for aesthetic purposes. They may be used for intersections having three to five approaching streets. Use of roundabouts on major streets shall be subject to special considerations and will require specific approval and be subject to specific design considerations determined by the Department of Public Works and Utilities.

3.14.2 Access Not Permitted.
Access directly to the roundabout from abutting properties shall not be permitted.

3.14.3 Roundabout Spacing
Roundabouts shall be spaced at least 900 feet (183 m) apart as measured from center to center.

3.14.4 Angle Between Approaching Streets
The angle between the centerlines of any two streets approaching the roundabout shall not be less than 70°.

3.14.5 Roundabouts on Curvilinear Streets
Where a roundabout is located on curvilinear streets, a straight tangent section shall be required at the approach to the roundabout. The minimum length of this tangent, as measured from the outside curb radius of the roundabout to the point of curvature on the approaching street, shall be as shown in the following table:

Centerline Radius	**Minimum Tangent Length**
150 ft. (45.7 m)	100 ft. (30.5 m)
175 ft. (53.3 m)	90 ft. (27.4 m)
200 ft. (61.0 m)	80 ft. (24.4 m)
225 ft. (68.6 m)	75 ft. (22.9 m)
250 ft. (76.2 m)	70 ft. (21.3 m)
275 ft. (83.8 m)	65 ft. (19.8 m)
300 ft. (91.4 m)	60 ft. (18.3 m)
350 ft. (106.7 m)	50 ft. (15.2 m)
400 ft. (121.9 m)	20 ft. (6.1 m)
450 ft. (137.2 m) and over	No Tangent Required

Roundabouts may be placed along a horizontal curve provided that the centerline radius of the curve is 525 feet (160 m) or greater, and that the minimum sight distances, based on the design speed of the approaching streets, are provided.

3.14.6 Grades
The grade of any roadway approaching a roundabout shall not exceed 3.0% within 70 feet (21.3 m) of the outside curb radius of the roundabout. The grades across the roundabout shall not exceed 3.0%.

3.14.7 Geometry

In general, roundabouts in residential districts shall be designed to accommodate the turning radius of a standard AASHTO BUS design vehicle and roundabouts in commercial industrial districts shall accommodate a standard AASHTO WB-50 design vehicle.

3.14.8 Right-of-Way

The right-of-way for the roundabout shall have a minimum radius equal to the radius of the outside curb line of the roundabout plus 16.5 feet (5.0 m).

3.14.9 Splitter Islands

Splitter islands shall have a minimum area of 80 square feet (7.43 m^2).

3.14.10 Curbs

Concrete curbs shall be placed on both sides of the rotary roadway and around the splitter islands. Curbs may be either combined curb and gutter or integral curb and shall conform to the requirements of the *City of Lincoln Standard Specifications for Municipal Construction* and the details shown on the *Lincoln Standard Plans*.

3.14.11 Roadway Cross-slope

The transverse slope of the rotary roadway paving shall not exceed 3.0%.

3.14.12 Landscaping

The center island of the roundabout may be landscaped using approved plant materials not exceeding maximum mature height of 24 inches and certain designated street trees conforming to the requirements of the *Design Standards for Street Trees*. Trees placed in the center island shall be trimmed up to 6 ft. (1.8 m) above the ground and maintained for traffic sight clearance. Notwithstanding the above, no plant material, having a maximum mature height in excess of 6 inches shall be placed within 4 ft. (1.2 m) from the back of the curb. Landscape maintenance and replacement, by written agreement between the City and the appropriate parties, shall be the responsibility of the abutting property owners, a homeowners association or other private entity. Landscaping plans shall include a program for maintenance and replacement of trees and plant material and shall be approved by the Department of Public Works and Utilities and the City Parks and Recreation Department. All landscaping shall be installed within two planting seasons following the paving construction.

3.14.13 Sidewalks

Pedestrian traffic across the rotary roadway and center island is to be discouraged. Crosswalks on the approach roadways shall be located at least 25 feet (7.6 m) back from the yield line or outside radius of roundabout.

3.14.14 Signs

The roundabout shall have the required traffic control signs, as determined by the Department of Public Works and Utilities, in place prior to opening to traffic.